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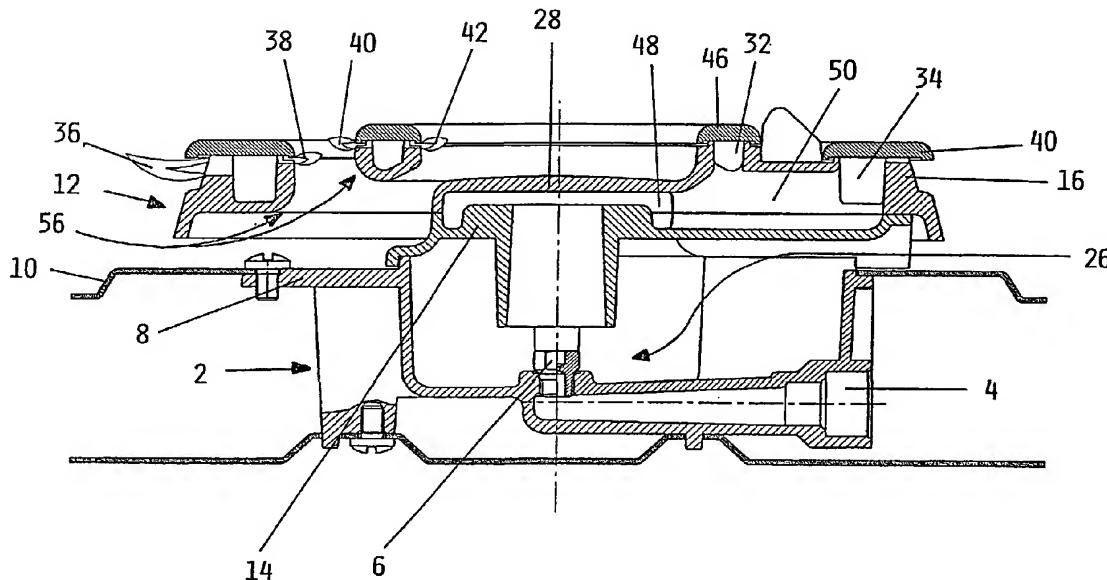
[Continued on next page]

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(54) Title: GAS BURNER WITH SEVERAL FLAME SECTORS



**WO 03/036168 A1**

(57) Abstract: A gas burner with several flame sectors for cooking appliances, comprising: a cup (2) positioned below the hob and provided with an injector (4) which forms a gas mixture with primary air originating from outside the hob, a flame divider (12) superposed on said cup and comprising a radial venturi tube (14) connected to two concentric annular chambers (32,34), caps (40,46) closing said annular tubes, the secondary air originating from outside the hob, characterised in that said flame divider presents four mutually concentric flame rings (36,38,40,42).



— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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## GAS BURNER WITH SEVERAL FLAME SECTORS

This invention relates to a gas burner with several flame sectors.

Gas burners for food cooking are known, comprising a burner body fed via a nozzle by a gas flow which entrains a flow of primary air and mixes therewith to 5 form a mixture which when suitably ignited generates a ring of radial flames adjustable in size by a tap positioned upstream of the nozzle.

In addition to traditional burners comprising one flame ring, so-called "double ring", "triple ring" and double burners are also commercially available. These latter comprise two flame rings controllable separately by one or two feed 10 taps.

This type of burner has been available for some time, but recently it has been sought to limit its dimensions to enable it to be also used in built-in cooking hobs having a height of about 30 mm, in addition to its use in free-standing cookers.

15        Burners of this type generally draw their primary and secondary air from above the cooking utensil so that normal burner operation is not interrupted by possible air movements which may take place within the interior of the cooking appliance, caused for example by the opening of a door in a furniture unit positioned below the cooking hob or by the presence of the oven situated under 20 said hob.

Published European patent application 0 543 301 relates to a burner of small dimensions and hence suitable for mounting in built-in hobs, which comprises two flame rings and uses primary and secondary air taken from above the cooking hob. The air-gas mixture is created by a radial venturi of very low 25 height, and is distributed within the two flame rings via four horizontally disposed radial conduits.

European patent 0 797 048 describes a burner similar to the preceding characterised by the presence of a third flame ring present in the central part of the burner.

In these burners, as in similar commercially available burners, the flames  
5 are distributed over two or at most three flame rings which are hence directed mostly towards the outside rather than the inside of the base of the pan.

A drawback of these burners consists of the fact that, as the third ring is provided on a fairly large diameter and as it is directed towards the outside of the cooking utensil, the resultant cooking is not uniform over the entire pan.

10 An object of the invention is to eliminate this drawback by providing a flame burner with four or more flames having excellent flame distribution below the pan to hence obtain high cooking efficiency while at the same time maintaining the now well consolidated dimensioning and operating principle.

This and further objects which will be apparent from the ensuing  
15 description are attained according to the invention by a gas burner with several flame sectors for cooking appliances as described in claim 1.

A preferred embodiment of this invention and a variant thereof are described in detail hereinafter with reference to the accompanying drawings, in which:

- 20 Figure 1 is a plan view of a burner according to the invention,  
Figure 2 is a section through the burner on the line II-II of Figure 1,  
Figure 3 is a plan view of the venturi tube,  
Figure 4 is a section therethrough on the line IV-IV of Figure 3,  
Figure 5 is a plan view of the hollow body,  
25 Figure 6 is a plan view of a different embodiment of the burner, and  
Figure 7 is a longitudinal section therethrough on the line VI-VI of Figure 6.

As can be seen from the figures, the burner of the invention comprises a cup piece 2 provided lowerly with a conduit 4 feeding an injector 6. At its upper edge, the cup piece comprises an annular flange 8 for its fixing to the sheet metal 10 of the cooking hob. On the cup 2 there rests a flame divider element, indicated 5 overall by 12 and consisting of two parts, namely the venturi tube 14 and the hollow body 16, these being joined together by connection elements 18.

The venturi tube 14 comprises, for its support and centering on the cup piece 2, a flange 20 rigid with a frusto-conical tube piece 22 facing the injector 6 and from which there extent four equiangular radial webs 24 which with the hob 10 10 and annular flange 8 form radial channels 26 for entry of the primary air.

The hollow body 16 presents a circular central portion 28 from which four radial webs 30 extend to form elements by which two annular chambers 32, 34 respectively are joined together.

The outer annular chamber 34 comprises along its outer edge a first ring 15 36 of flame slits and along its inner edge a second ring 38 of flame slits 38. Said ring is closed upperly by an annular cap 40. The inner annular chamber 32 comprises along its outer edge a third ring 40 of flame slits and along its inner edge a fourth ring 42 of flame slits. The fourth flame ring 42 is formed as four sectors 44, with the flame slits of each sector disposed parallel to each other.

20 The annular chamber 32 is closed upperly by an annular cap 46.

With the upper edge of the tube piece 22 the central portion 28 forms a mixing chamber 48 from which there radially extend four conduits 50 which:

- convey the air-gas mixture via apertures 52 to the annular chamber 32 which feeds the flame rings 40, 42, and
- 25 - convey the air-gas mixture via apertures 54 to the annular chamber 34 which feeds the flame rings 36 and 38.

With the hob 10 and annular flange 8 the flame divider 12 forms channels 56 for the passage of secondary air to the second 38, third 40 and fourth 42 flame ring.

From the foregoing it is apparent that the burner of the invention presents 5 numerous advantages, and in particular:

- it presents excellent flame distribution in that the most inner ring directs its flames towards the central part of the pan,
- it enables primary air and secondary air to be taken from above the hob,
- it is of low height because of the radial configuration of the venturi tube.

10 In the embodiment shown in Figures 6 and 7, the central portion 28 comprises on its surface an annular rim 58 in which flame slits 60 are provided.

The central body also presents a hole 62 feeding a venturi nozzle 64 faced by a closure plate 66.

15 This embodiment with five flame rings presents the further advantage that the flame is directed into a very localized central region.

## C L A I M S

1. A gas burner with several flame sectors for cooking appliances, comprising:

- a cup (2) positioned below the hob and provided with an injector(4) which forms a gas mixture with primary air originating from outside the hob,

5 - a flame divider (12) superposed on said cup and comprising a radial venturi tube (14) connected to two concentric annular chambers (32, 34),

- caps (40, 46) closing said annular tubes,

the secondary air originating from outside the hob,

characterised in that said flame divider presents four mutually concentric flame

10 rings (36, 38, 40, 42).

2. A burner as claimed in claim 1, characterised by comprising radial channels (50) presenting apertures (52) which connect them to the annular conduit (32), and in the walls of which there are provided the flame slits of the third (40) and fourth (42) flame rings.

15 3. A burner as claimed in claim 1, characterised in that with the hob (10) and annular flange (8) the flame divider forms channels (56) for the passage of secondary air to the second (38), third (40) and fourth (42) flame ring.

4. A burner as claimed in claim 1, characterised in that the fourth flame ring (42) is formed in four sectors (44).

20 5. A burner as claimed in claim 4, characterised in that the flame slits of each sector (44) are mutually parallel.

6. A burner as claimed in claim 1, characterised in that the flame divider presents a central body (28) comprising a rim in which fifth flame slits (60) are provided and further comprising a hole (62) feeding a venturi nozzle (64).

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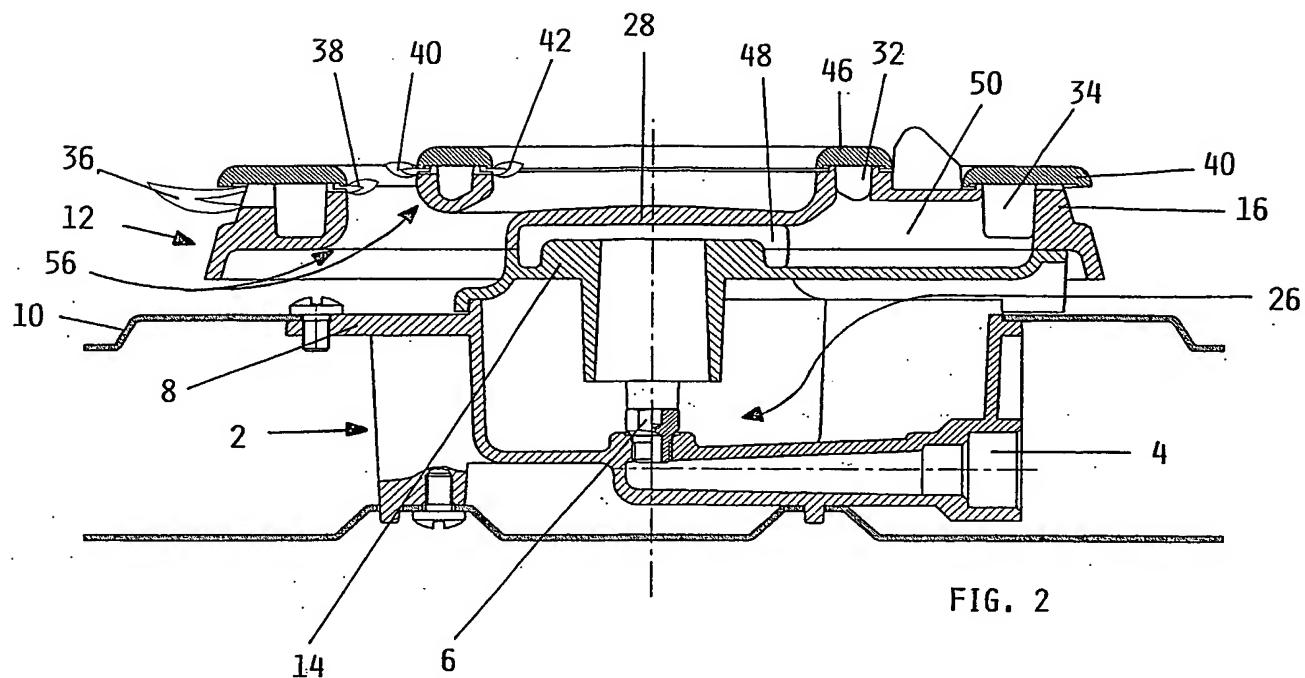


FIG. 2

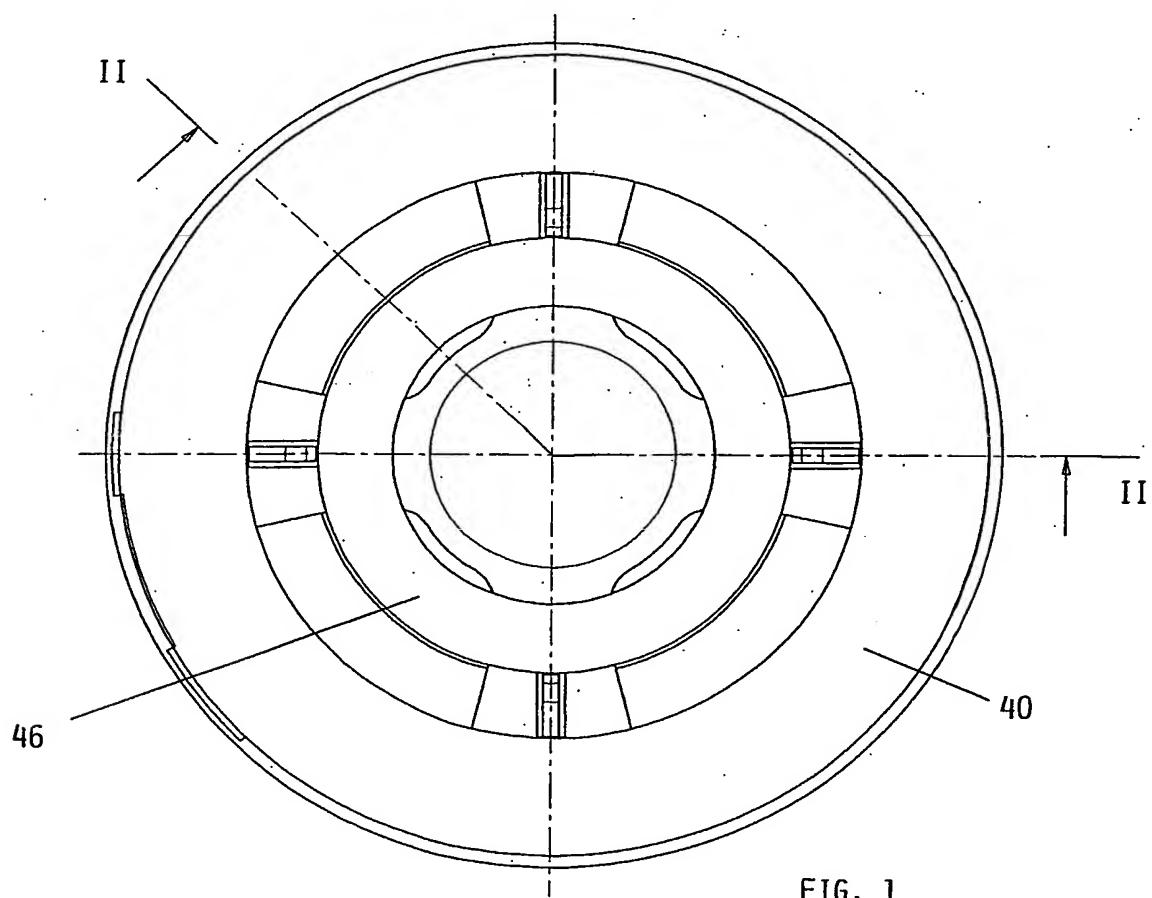


FIG. 1

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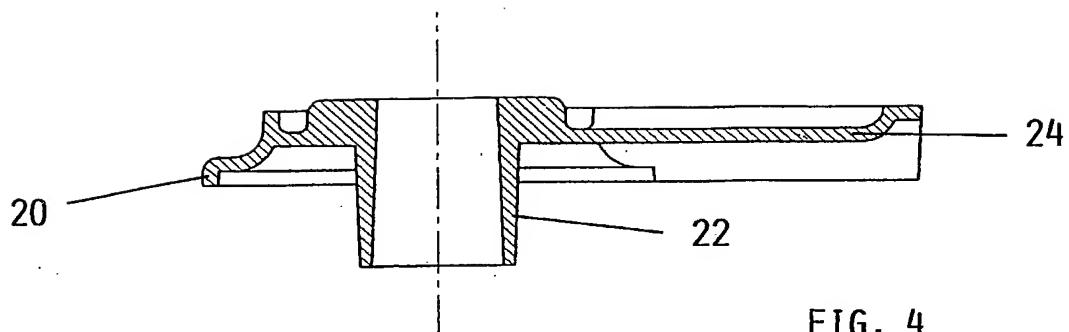


FIG. 4

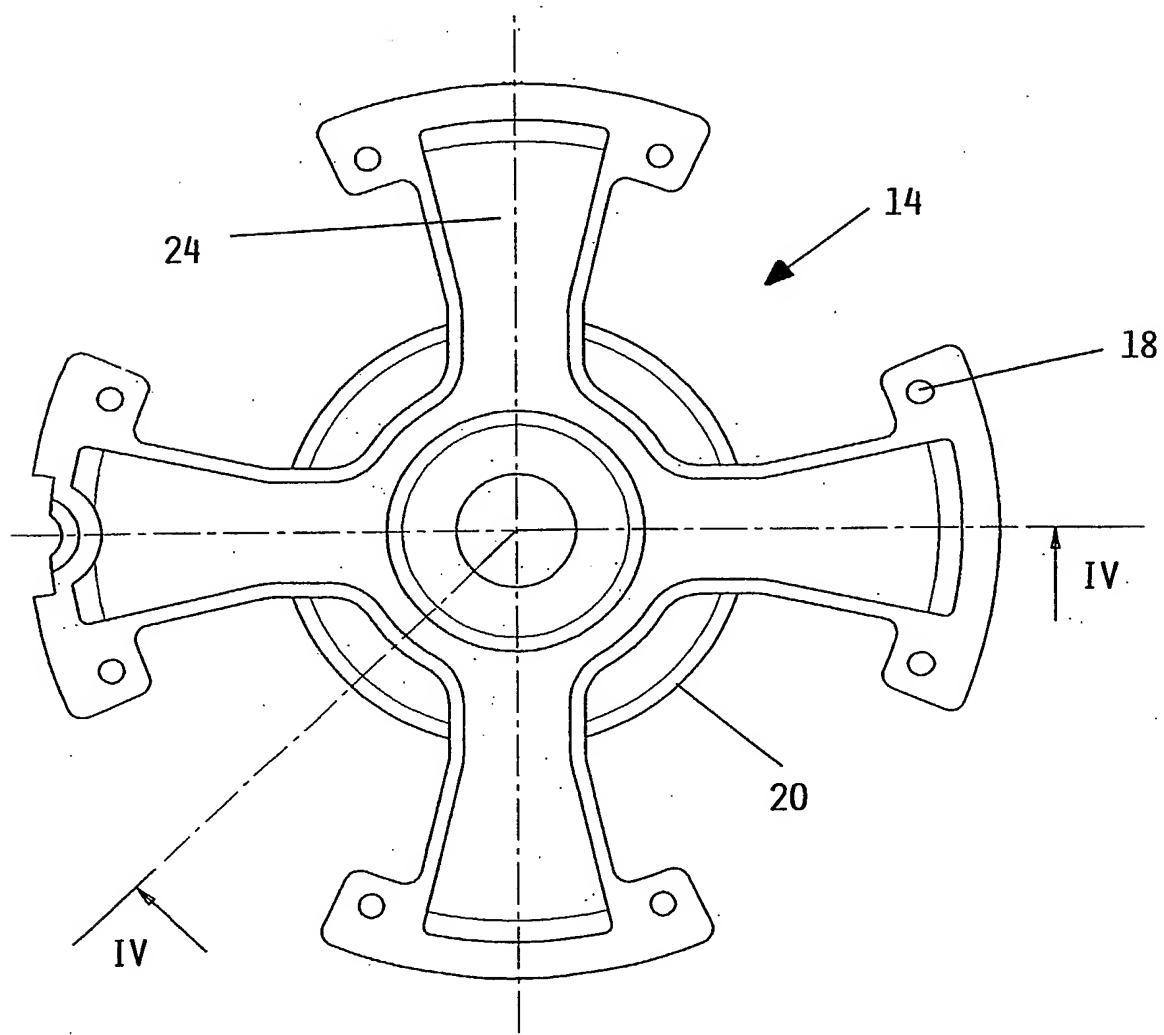


FIG. 3

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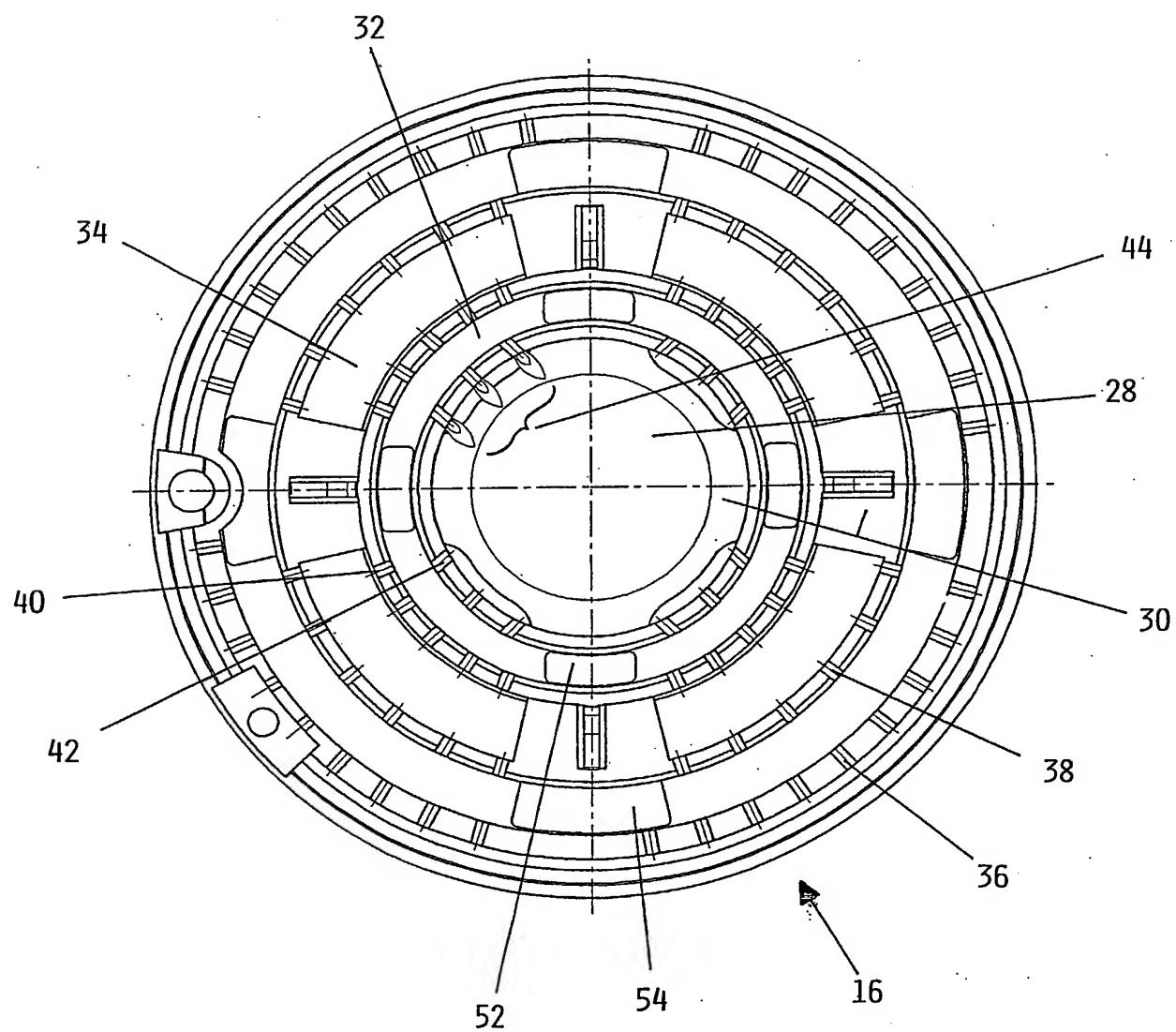
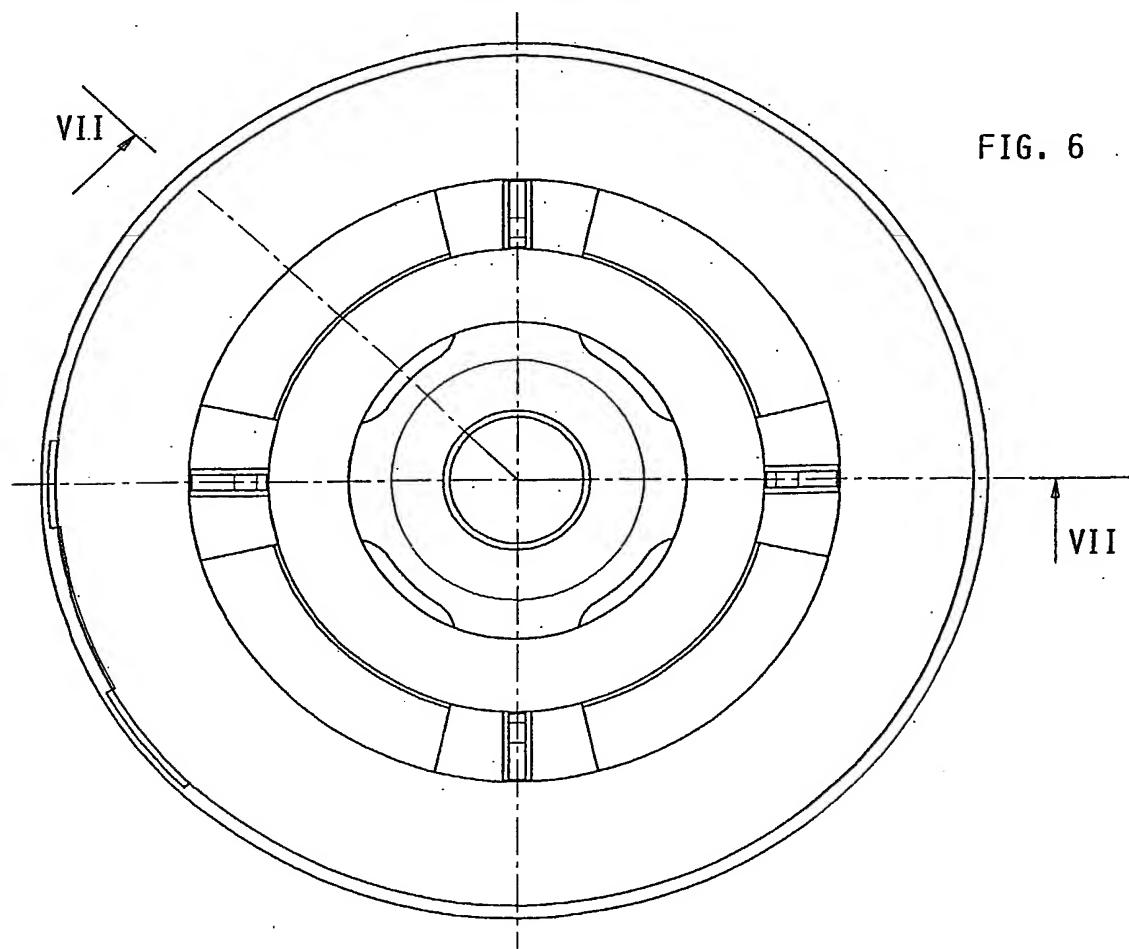
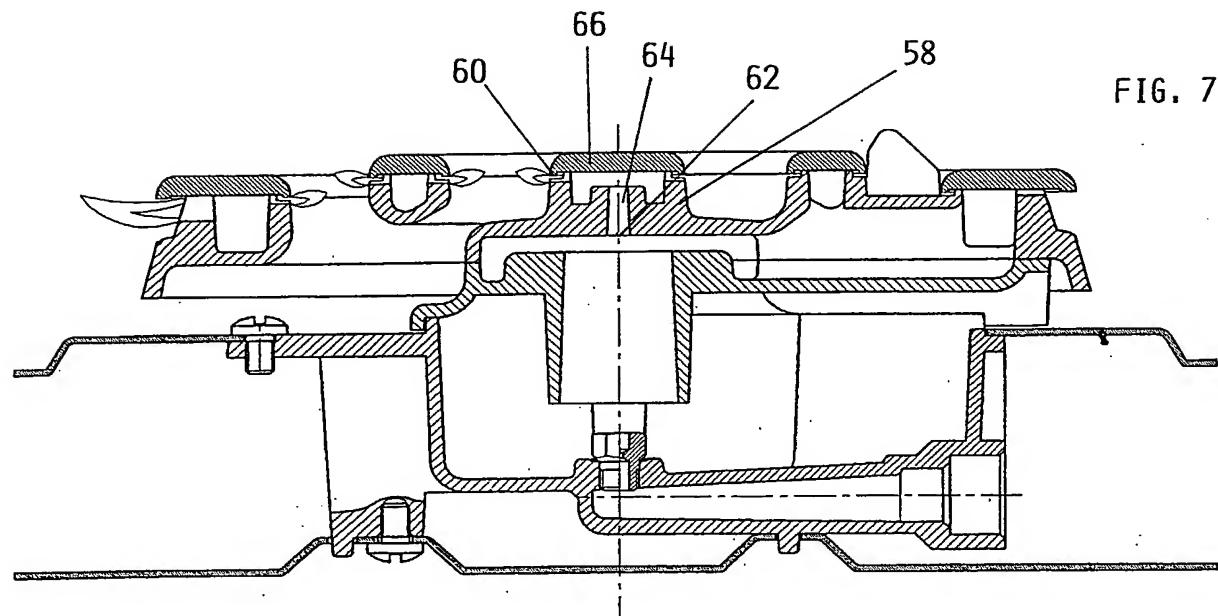


FIG. 5

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# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
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According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 132 205 A (HARNEIT UWE) 17 October 2000 (2000-10-17) figures 3-5 column 3, line 43 - line 44 column 6, line 27 - line 53 column 7, line 39 - line 60 ---	1-6
Y	EP 0 797 048 A (SABAF SPA) 24 September 1997 (1997-09-24) column 5, line 11 - line 18 ---	1-6
A	WO 99 11975 A (ESKILDESEN CHRISTIAN ;ARMANNI PIERO (IT); ELECTROLUX AB (SE)) 11 March 1999 (1999-03-11) page 3, line 28 -page 4, line 6 figures 3-5 ---	1,4,5 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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International Application No  
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 197 063 A (CHIN SHIN CHANG) 11 May 1988 (1988-05-11) page 1, line 90 -page 2, line 19 ---	1
A	FR 2 405 431 A (MARTINEZ ANTOINE) 4 May 1979 (1979-05-04) figure W ---	1
A	US 5 842 849 A (HUANG HSU-SHENG) 1 December 1998 (1998-12-01) column 2, line 8 - line 54 figure 2 -----	4,5

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/EP 02/11846

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 6132205	A	17-10-2000	NONE		
EP 0797048	A	24-09-1997	EP PL SI TR AT DE DE DE ES	0797048 A1 319027 A1 797048 T1 9700179 A1 184384 T 69604153 D1 69604153 T2 797048 T1 2107401 T1	24-09-1997 29-09-1997 31-12-1999 21-10-1997 15-09-1999 14-10-1999 25-05-2000 12-03-1998 01-12-1997
WO 9911975	A	11-03-1999	WO AU EP	9911975 A1 3939497 A 1025392 A1	11-03-1999 22-03-1999 09-08-2000
GB 2197063	A	11-05-1988	NONE		
FR 2405431	A	04-05-1979	FR ES	2405431 A1 238495 Y	04-05-1979 01-04-1979
US 5842849	A	01-12-1998	NONE		

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**EUR-CL (EPC):** F23D014/06 , F24C003/08

**ABSTRACT:**

CHG DATE=20030603 STATUS=O>A gas burner with several flame sectors for cooking appliances, comprising: a cup (2) positioned below the hob and provided with an injector (4) which forms a gas mixture with

primary air originating from outside the hob, a flame divider (12) superposed on said cup and comprising a radial venturi tube (14) connected to two concentric annular chambers (32,34), caps (40,46) closing said annular tubes, the secondary air originating from outside the hob, characterised in that said flame divider presents four mutually concentric flame rings (36,38,40,42).